CLAIMS

What is claimed is:

1. An athermal optical coupler comprising:

at least two optical waveguides, at least a portion of each of said optical waveguides being fused together to form a fused section, said fused section having a positive coefficient of thermal expansion; and

a jacket surrounding said fused section, said jacket being formed from a material having a negative coefficient of thermal expansion.

2. The athermal optical coupler of claim 1, wherein an absolute value of said negative coefficient of thermal expansion is approximately equal to an absolute value of said positive coefficient of thermal expansion.

3. The athermal optical coupler of claim 1, wherein said material comprises a ceramic.

4. The athermal optical coupler of claim 1, wherein said waveguides comprise fiber optic cables and wherein said fused section is fixed within said jacket using a resin.

5. The athermal optical coupler of claim 4 wherein each of said fiber optic cables is a single mode fiber optic cable.

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6. The athermal optical coupler of claim 4, wherein said resin is an epoxy resin.

7. The athermal optical coupler of claim 6, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to said negative coefficient.

8. The athermal optical coupler of claim 6, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to zero.

9. The athermal optical coupler of claim 6, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to said positive coefficient.

10. The athermal optical coupler of claim 1 wherein said fused section allows light signals traveling on a first optical waveguide to be propagated onto a second optical waveguide and vice versa.

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11. A fused fiber optic coupler, comprising:

at least two fiber optic cables each having a positive coefficient of thermal expansion, wherein a section of each of said fiber optic cables is fused together to form a fused section capable of operating as a coupler; and

a ferrule having a negative coefficient of thermal expansion wherein said ferrule being mounted to and disposed from said fused section of said fiber optic cables by a filler material fills disposed in a gap between said ferrule and said fused section.

12. The fused fiber optic coupler of claim 11, wherein an absolute value of said negative coefficient is approximately equal to an absolute value of said positive coefficient.

13. The fused fiber optic coupler of claim 11, wherein said ferrule comprises a ceramic.

14. The fused fiber optic coupler of claim 11, wherein said coupler is fixed within said ferrule using a resin.

15. The fused fiber optic coupler of claim 14, wherein said resin is an epoxy resin.

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16. The fused fiber optic coupler of claim 15, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to said negative coefficient.

17. The fused fiber optic coupler of claim 15, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to zero.

18. The fused fiber optic coupler of claim 15, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to said positive coefficient.

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19. A method for manufacturing an athermal fiber optic coupler, said method comprising:

a step for fusing together at least a portion of at least two fiber optic cables to form an optical coupler, said optical coupler having a positive coefficient of thermal expansion;

a step for mounting a jacket to said optical coupler, said jacket being formed from a material having a negative coefficient of thermal expansion; and

a step for injecting a filler material into a gap between said ferrule and said fused section.

20. The method of claim 19, wherein an absolute value of said negative coefficient of thermal expansion is approximately equal to an absolute value of said positive coefficient of thermal expansion.

21. The method of claim 19, wherein said material comprises a ceramic.

22. The method of claim 19, wherein said coupler is fixed within said jacket using a resin.

23. The method of claim 22, wherein said resin is an epoxy resin.

24. The method of claim 23, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to said negative coefficient.

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25. The method of claim 23, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to zero.

26. The method of claim 23, wherein said epoxy resin has a coefficient of thermal expansion approximately equal to said positive coefficient.

27. The method of claim 19, wherein the step of fusing together said portions of said at least two fiber optic cables includes a step for stripping a cladding component away from said portions to expose said portions.

28. The method of claim 27 wherein each of said fiber optic cables is a single mode fiber optic cable.

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